

## Nuclear Regulatory Commission

## § 74.4

### Subpart E—Formula Quantities of Strategic Special Nuclear Material

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AUTHORITY: Secs. 53, 57, 161, 182, 183, 68 Stat. 930, 932, 948, 953, 954, as amended, sec. 234, 83 Stat. 444, as amended, sec. 1701, 106 Stat. 2951, 2952, 2953 (42 U.S.C. 2073, 2077, 2201, 2232, 2233, 2282, 2297f); secs. 201, as amended, 202, 206, 88 Stat. 1242, as amended, 1244, 1246 (42 U.S.C. 5841, 5842, 5846); sec. 1704, 112 Stat. 2750 (44 U.S.C. 3504 note).

SOURCE: 50 FR 7579, Feb. 25, 1985, unless otherwise noted.

### Subpart A—General Provisions

#### § 74.1 Purpose.

(a) This part has been established to contain the requirements for the control and accounting of special nuclear material at fixed sites and for documenting the transfer of special nuclear material. General reporting requirements as well as specific requirements for certain licensees possessing special nuclear material of low strategic significance, special nuclear material of moderate strategic significance, and formula quantities of strategic special nuclear material are included. Requirements for the control and accounting of source material at enrichment facilities are also included.

(b) The general conditions and procedures for the submittal of a license application for the activities covered in this part are detailed in § 70.22 of this chapter.

[50 FR 7579, Feb. 25, 1985, as amended at 56 FR 55998, Oct. 31, 1991; 67 FR 78144, Dec. 23, 2002]

#### § 74.2 Scope.

(a) The general reporting and recordkeeping requirements of subpart B of this part apply to each person licensed

pursuant to this chapter who possess special nuclear material in a quantity greater than 350 grams of contained uranium-235, uranium-233, or plutonium, or any combination thereof; or who transfers or receives a quantity of special nuclear material of 1 gram or more of contained uranium-235, uranium-233, or plutonium. The general reporting and recordkeeping requirements of subpart B of this part do not apply to licensees whose MC&A reporting and recordkeeping requirements are covered by §§ 72.72, 72.76, and 72.78 of this chapter.

(b) In addition, specific control and accounting requirements are included in subparts C, D, and E for certain licensees who:

(1) Possess and use formula quantities of strategic special nuclear material;

(2) Possess and use special nuclear material of moderate strategic significance;

(3) Possess and use special nuclear material of low strategic significance; or

(4) Possess uranium source material and equipment capable of producing enriched uranium.

(c) As provided in part 76 of this chapter, the regulations of this part establish procedures and criteria for material control and accounting for the issuance of a certificate of compliance or the approval of a compliance plan.

[67 FR 78144, Dec. 23, 2002]

#### § 74.4 Definitions.

As used in this part:

*Abrupt loss* means a loss occurring in the time interval between consecutive sequential performances of a material control test which is designed to detect anomalies potentially indicative of a loss of strategic special nuclear material from a specific unit of SSNM (i.e., a quantity characterized by a unique measurement) introduced into a process.

*Accessible location* means a process location at which SSNM could be acquired without leaving evidence of the acquisition, i.e., without tools or other equipment to obviously violate the integrity of the containment.

*Act* means the Atomic Energy Act of 1954 (68 Stat. 919), including any amendments thereto.

*Active inventory* means the sum of additions to inventory, beginning inventory, ending inventory, and removals from inventory, after all common terms have been excluded. Common terms are any material values which appear in the active inventory calculation more than once and come from the same measurement.

*Additions to material in process* means: (1) Receipts that are opened, except for receipts opened only for sampling and subsequently maintained under tamper-safing; (2) opened sealed sources; and (3) material removed from process for nonconformance with chemical or physical specifications that is subsequently reprocessed, measured for contained SSNM, and reintroduced to process.

*Alarm Threshold* means a predetermined quantity of SSNM calculated from the specified probability of detection for a given loss and the standard deviation associated with a material control test. An alarm threshold serves to trigger a response action.

*Batch* means a portion of source material or special nuclear material handled as a unit for accounting purposes at a key measurement point and for which the composition and quantity are defined by a single set of measurements. The source material or special nuclear material may be in bulk form or contained in a number of separate items.

*Beginning inventory (BI)* means the book inventory quantity at the beginning of an inventory period, and is the reconciled physical inventory entered into the books as an adjusted inventory at the completion of the prior inventory period.

*Bias* means the deviation of the expected value of a random variable from the corresponding correct or assigned value.

*Calibration* means the process of determining the numerical relationship between the observed output of a measurement system and the value, based upon reference standards, of the characteristic being measured.

*Category IA material* means SSNM directly useable in the manufacture of a nuclear explosive device, except if:

(1) The dimensions are large enough (at least two meters in one dimension, greater than one meter in each of two dimensions, or greater than 25cm in each of three dimensions) to preclude hiding the item on an individual;

(2) The total weight of an encapsulated item of SSNM is such that it cannot be carried inconspicuously by one person (*i.e.*, at least 50 kilograms gross weight); or

(3) The quantity of SSNM (less than 0.05 formula kilograms) in each container requires protracted diversions to accumulate five formula kilograms.

*Category IB material* means all SSNM material other than Category IA.

*Commission* means the Nuclear Regulatory Commission or its duly authorized representatives.

*Continuous process* means a unit process in which feed material must be introduced in a systematic manner in order to maintain equilibrium conditions.

*Controlled access area* means any temporarily or permanently established area which is clearly demarcated, access to which is controlled, and which affords isolation of the material or persons within it.

*DOE* means the U.S. Department of Energy or its duly authorized representatives.

*Effective kilograms of special nuclear material* means:

(1) For plutonium and uranium-233 their weight in kilograms;

(2) For uranium with an enrichment in the isotope  $U^{235}$  of 0.01 (1 percent) and above, its element weight in kilograms multiplied by the square of its enrichment expressed as a decimal weight fraction; and

(3) For uranium with an enrichment in the isotope  $U^{235}$  below 0.01 (1 percent), its element weight in kilograms multiplied by 0.0001.

*Element* means uranium or plutonium.

*Estimate* means a specific numerical value arrived at by the application of an estimator.

*Estimator* means a function of a sample measurement used to estimate a population parameter.

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*Fissile isotope* means: (1) Uranium U-233, or (2) uranium-235 by enrichment category, (3) plutonium-239, and (4) plutonium-241.

*Formula kilogram* means SSNM in any combination in a quantity of 1000 grams computed by the formula,  $\text{grams} = (\text{grams contained U-235}) + 2.5 (\text{grams U-233} + \text{grams plutonium})$ .

*Formula quantity* means strategic special nuclear material in any combination in a quantity of 5,000 grams or more computed by the formula,  $\text{grams} = (\text{grams contained U}^{235}) + 2.5 (\text{grams U}^{233} + \text{grams plutonium})$ .

*Government agency* means any executive department, commission, independent establishment, corporation, wholly or partly owned by the United States of America, which is an instrumentality of the United States, or any board, bureau, division, service, office, officer, authority, administration, or other establishment in the executive branch of the Government.

*High enriched uranium* means uranium enriched to 20 percent or greater in the isotope uranium-235.

*Inventory difference (ID)* means the arithmetic difference obtained by subtracting the quantity of SNM tabulated from a physical inventory from the book inventory quantity. Book inventory quantity is equivalent to the beginning inventory (BI) plus additions to inventory (A) minus removals from inventory (R), while the physical inventory quantity is the ending inventory (EI) for the material balance period in question (as physically determined). Thus mathematically,  $ID = (BI + A - R) - EI$  or  $ID = BI + A - R - EI$ .

*Item* means any discrete quantity or container of special nuclear material or source material, not undergoing processing, having a unique identity and also having an assigned element and isotope quantity.

*License*, except where otherwise specified, means a license issued pursuant to part 70 of this chapter.

*Low enriched uranium* means uranium enriched below 20 percent in the isotope uranium-235.

*Material* means special nuclear material.

*Material access area* means any location which contains special nuclear material, within a vault or a building,

the roof, walls, and floor of which constitute a physical barrier.

*Material balance* means the determination of an inventory difference (ID).

*MC&A alarm* means a situation in which there is: (1) an out-of-location item or an item whose integrity has been violated, (2) an indication of a flow of SSNM where there should be none, or (3) a difference between a measured or observed amount or property of material and its corresponding predicted or property value that exceeds a threshold established to provide the detection capability required by § 74.53.

*Material control test* means a comparison of a pre-established alarm threshold with the results of a process difference or process yield performed on a unit process.

*Material in process* means any special nuclear material possessed by the licensee except in unopened receipts, sealed sources, measured waste discards, and ultimate product maintained under tamper-safing.

*Measurement* includes sampling and means the determination of mass, volume, quantity, composition or other property of a material where such determinations are used for special nuclear material control and accounting purposes.

*Measurement system* means all of the apparatus, equipment, instruments and procedures used in performing a measurement.

*Person* means:

(1) Any individual, corporation, partnership, firm, association, trust, estate, public or private institution, group, Government agency other than the Commission or the Department of Energy, except that the Department of Energy shall be considered a person within the meaning of the regulations in this part to the extent that its facilities and activities are subject to the licensing and related regulatory authority of the Commission pursuant to section 202 of the Energy Reorganization Act of 1974 (88 Stat. 1244), any state or any political subdivision of or any political entity within a state, any foreign government or nation or political subdivision of any such government or nation, or other entity; and

(2) Any legal successor, representative, agent, or agency of the foregoing.

*Physical inventory* means determination on a measured basis of the quantity of special nuclear material on hand at a given time. The methods of physical inventory and associated measurements will vary depending on the material to be inventoried and the process involved.

*Plant* means a set of processes or operations (on the same site, but not necessarily all in the same building) coordinated into a single manufacturing, R&D, or testing effort. A scrap recovery operation, or an analytical laboratory, serving both onsite and offsite customers (or more than one onsite manufacturing effort) should be treated as a separate plant.

*Power of detection* means the probability that the critical value of a statistical test will be exceeded when there is an actual loss of a specific SSNM quantity.

*Process difference* (PD) means the determination of an ID on a unit process level with the additional qualification that difficult to measure components may be modeled.

*Process yield* means the quantity of SSNM actually removed from a unit process compared with the quantity predicted (based on a measured input) to be available for removal. Process yield differs from a process difference in that holdup and sidestreams are not measured or modeled.

*Produce* when used in relation to special nuclear material, means: (1) To manufacture, make, produce, or refine special nuclear material; (2) to separate special nuclear material from other substances in which such material may be contained; or (3) to make or to produce new special nuclear material.

*Random error* means the deviation of a random variable from its expected value.

*Receipt* means special nuclear material received by a licensee from an offsite source.

*Reference standard* means a material, device, or instrument whose assigned value is known relative to national standards or nationally accepted measurement systems. This is also com-

monly referred to as a traceable standard.

*Removals from inventory* means measured quantities of special nuclear material contained in:

- (1) Shipments;
- (2) Waste materials transferred to an onsite holding account via a DOE/NRC Form 741 transaction;
- (3) Measured discards transported offsite; and
- (4) Effluents released to the environment.

*Removals of material from process* (or *removals from process*) means measured quantities of special nuclear material contained in:

- (1) Effluents released to the environment;
- (2) Previously unencapsulated materials that have been encapsulated as sealed sources;
- (3) Waste materials that will not be subject to further onsite processing and which are under tamper-safing;
- (4) Ultimate product placed under tamper-safing; and
- (5) Any materials (not previously designated as removals from process) shipped offsite.

*Research and development* means: (1) Theoretical analysis, exploration, or experimentation; or (2) the extension of investigative findings and theories of a scientific or technical nature into practical application for experimental and demonstration purposes, including the experimental production and testing of models, devices, equipment, materials, and processes.

*Scrap* means the various forms of special nuclear material generated during chemical and mechanical processing, other than recycle material and normal process intermediates, which are unsuitable for continued processing, but all or part of which will be converted to useable material by appropriate recovery operations.

*Sealed source* means any special nuclear material that is physically encased in a capsule, rod, element, etc. that prevents the leakage or escape of the special nuclear material and that prevents removal of the special nuclear material without penetration of the casing.

*Source material* means source material as defined in section 11z. of the Act

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and in the regulations contained in part 40 of this chapter.

*Special nuclear material* means:

(1) Plutonium, uranium-233, uranium enriched in the isotope  $U^{233}$  or in the isotope  $U^{235}$ , and any other material which the Commission, pursuant to the provisions of section 51 of the Atomic Energy Act of 1954, as amended, determines to be special nuclear material, but does not include source material; or

(2) Any material artificially enriched by any of the foregoing, but does not include source material.

*Special nuclear material of low strategic significance* means:

(1) Less than an amount of special nuclear material of moderate strategic significance, but more than 15 grams of uranium-235 (contained in uranium enriched to 20 percent or more in the  $U^{235}$  isotope) or 15 grams of uranium-233 or 15 grams of plutonium or the combination of 15 grams when computed by the equation,  $\text{grams} = \text{grams contained } U^{235} + \text{grams plutonium} + \text{grams } U^{233}$ ; or

(2) Less than 10,000 grams but more than 1,000 grams of uranium-235 (contained in uranium enriched to 10 percent or more, but less than 20 percent in the  $U^{235}$  isotope); or

(3) 10,000 grams or more of uranium-235 contained in uranium enriched above natural, but less than 10 percent in the  $U^{235}$  isotope.

*Special nuclear material of moderate strategic significance* means:

(1) Less than a formula quantity of strategic special nuclear material but more than 1,000 grams of uranium-235 (contained in uranium enriched to 20 percent or more in the  $U^{235}$  isotope) or more than 500 grams of uranium-233 or plutonium or in a combined quantity of more than 1,000 grams when computed by the equation,  $\text{grams} = (\text{grams contained } U^{235}) + 2 (\text{grams } U^{233} + \text{grams plutonium})$ ; or

(2) 10,000 grams or more of uranium-235 (contained in uranium enriched to 10 percent or more but less than 20 percent in the  $U^{235}$  isotope).

*Standard Error of the Inventory Difference* (SEID) means the standard deviation of an inventory difference that takes into account all measurement error contributions to the components of the ID.

*Standard Error of the Process Difference* means the standard deviation of a process difference value that takes into account both measurement and nonmeasurement contributions to the components of PD.

*Strategic special nuclear material* means uranium-235 (contained in uranium enriched to 20 percent or more in the  $U^{235}$  isotope), uranium-233, or plutonium.

*Tamper-safing* means the use of devices on containers or vaults in a manner and at a time that ensures a clear indication of any violation of the integrity of previously made measurements of special nuclear material within the container or vault.

*Traceability* means the ability to relate individual measurement results to national standards or nationally accepted measurement systems through an unbroken chain of comparisons.

*Ultimate product* means any special nuclear material in the form of a product that would not be further processed at that licensed location.

*Unit process* means an identifiable segment or segments of processing activities for which the amounts of input and output SSNM are based on measurements.

*Unopened receipts* means receipts not opened by the licensee, including receipts of sealed sources, and receipts opened only for sampling and subsequently maintained under tamper-safing.

*Vault* means a windowless enclosure with walls, floor, roof and door(s) designed and constructed to delay penetration from forced entry.

[50 FR 7579, Feb. 25, 1985, as amended at 52 FR 10039, Mar. 30, 1987; 56 FR 55998, Oct. 31, 1991; 67 FR 78144, Dec. 23, 2002]

### § 74.5 Interpretations.

Except as specifically authorized by the Commission in writing, no interpretations of the meaning of the regulations in this part by any officer or employee of the Commission other than a written interpretation by the General Counsel will be recognized as binding on the Commission.

### § 74.6 Communications.

Any communication or report concerning the regulations in this part and